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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,574	01/23/2004	Teiichiro Umezawa	Q79566	3033

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EXAMINER	
BERNATZ, KEVIN M	

ART UNIT	PAPER NUMBER
1773	

DATE MAILED: 05/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/762,574	UMEZAWA ET AL.	
	Examiner	Art Unit	
	Kevin M. Bernatz	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 8-22* is/are pending in the application.

4a) Of the above claim(s) *3,4 and 8-10* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5,6 and 11-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/30/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Amendments to the specification and claims 1, 2, 5 and 6, cancellation of claim 7, and addition of new claims 11 - 22, filed on March 13, 2006, have been entered in the above-identified application.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Examiner's Comments

3. Regarding the language "said exchange coupling film causing antiferromagnetic coupling such that the first magnetic layer has a magnetization direction antiparallel to that of said second magnetic layer" is technically incorrect since applicants have defined the "exchange coupling film" to include at least the first magnetic layer, the second magnetic layer and the spacer layer.

One alternative way to word this limitation would be to recite that the *spacer* layer causes the antiferromagnetic coupling and anti-parallel magnetization directions between the first and second magnetic layers. It would also be proper to recite that the exchange coupling film possesses antiferromagnetic coupling such that the magnetization directions of the first and second magnetic films are anti-parallel.

The Examiner has not made a 112 1st or 2nd Paragraph rejection on the claim language, since the Examiner deems that one of ordinary skill in the art is still able to

comprehend the claim, but the Examiner recommends reconsidering the language to better clarify the claimed invention.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1, 2, 5 – 7, 11, 12, 16, 17, 18 and 19 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 - 12 of U.S. Patent No. 6,759,138 B2 (Tomiyasu et al.) for the reasons of record as set forth in Paragraph No. 8 of the Office Action mailed on September 13, 2005.

Regarding the amended language, the Examiner notes that claim 1 of US '138 B2 recites that the spacer layer induces antiferromagnetic exchange coupling between the first and second magnetic layers, where the definition of antiferromagnetic exchange coupling (or RKKY-type coupling) is that the magnetization directions are antiparallel.

Regarding the limitation(s) in the thickness of the spacer layer (claims 1 and 2), the Examiner notes that the disclosure of Tomiyasu et al. teach(es) that the claimed invention is an obvious variation of the disclosed invention (*col. 8, lines 10 - 13*).

Applicants are reminded that while it is generally prohibited from using the disclosure of a potentially conflicting patent or application in an Double Patenting analysis, there are two exceptions permitted by the MPEP. Specifically, "those portions of the specification which provide support for the patent claims may also be examined and considered when addressing the issue of whether a claim in the application defines an obvious variation of an invention claimed in the patent". In the instant case since all layers must possess some finite thickness value, the relied upon disclosure clearly provides support to the spacer layer by providing guidance as to what values in the thickness are required to meet the claimed invention (i.e. which values are obvious variants).

Regarding claims 11, 12, 16, 17, 18 and 19, Tomiyasu et al. recites claims meeting the presently claimed limitations. The Examiner notes that the language "is used as a layer for controlling exchange coupling and crystal orientation of said third magnetic layer" (claims 12 and 19) is an intended use limitation(s) and is not further limiting in so far as the structure of the product is concerned. Note that "in apparatus, article, and composition claims, intended use must result in a ***structural difference*** between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. ***If the prior art structure is capable of performing the intended use, then it meets the claim.*** In a claim drawn to a process

of making, the intended use must result in a manipulative difference as compared to the prior art." [emphasis added] *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); *In re Otto*, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2111.02.

Claim Rejections - 35 USC § 102

6. Claims 1, 2, 5 – 7, 11, 12, 16, 17, 18 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Tomiyasu et al. ('138 B2); ***- and –***

Claims 1, 2, 5 – 7, 11, 12, 16, 17, 18 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Tomiyasu et al. (U.S. Patent App. No. 2003/0104248 A1); ***- and –***

Claims 1, 2, 5 – 7, 11, 12, 16, 17, 18 and 19 are rejected under 35 U.S.C. 102(f) since applicants did not appear to invent the claimed subject matter since Tomiyasu et al. ('138 B2) has a different inventive entity than the pending application and it is unclear from the record *why* the inventorship is different when the disclosed and claimed inventions are substantially identical. See MPEP 2137. This rejection under 35 U.S.C. 102(f) can be overcome by a statement on the record clarifying the reason for the difference in inventorship or by correcting the inventorship if required.

All of these rejections are maintained for the reasons of record as set forth in Paragraph No. 10 of the Office Action mailed on September 13, 2005.

Regarding the amended language, the Examiner notes that claim 1 of US '138 B2 recites that the spacer layer induces antiferromagnetic exchange coupling between

the first and second magnetic layers, where the definition of antiferromagnetic exchange coupling (or RKKY-type coupling) is that the magnetization directions are antiparallel.

Regarding the limitation(s) in the thickness of the spacer layer (claims 1 and 2), the Examiner notes that Tomiyasu et al. teach the claimed limitation (*col. 8, lines 10 - 13*).

Regarding claims 11, 12, 16, 17, 18 and 19, Tomiyasu et al. teach the claimed limitations (*claims 1 – 12*). The Examiner notes that the language "is used as a layer for controlling exchange coupling and crystal orientation of said third magnetic layer" (claims 12 and 19) is an intended use limitation(s) and is not further limiting in so far as the structure of the product is concerned. Note that "in apparatus, article, and composition claims, intended use must result in a ***structural difference*** between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. ***If the prior art structure is capable of performing the intended use, then it meets the claim.*** In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art." [emphasis added] *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); *In re Otto*, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2111.02.

Claim Rejections - 35 USC § 103

7. Claims 1, 2, 5, 6, 11 – 13 and 16 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarra et al. (U.S. Patent No. 6,602,612 B2) in view of Fukuzawa et al. (U.S. Patent App. No. 2005/0030676 A1) – ***and*** –

8. Claims 1, 2, 5, 6, 11 – 13 and 16 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarra et al. (U.S. Patent App. No. 2001/0055701 A1) in view of Fukuzawa et al. ('676 A1). See U.S. Patent '612 B2, which is the US Patent based of the Abarra et al. U.S. published Patent Application '701 A1.

Regarding claim 1, Abarra et al. disclose a magnetic disk comprising a substrate surface (*Figure 1, element 1*) and an exchange coupling film (*elements 7, 8 and 9*) on said substrate surface, said exchange coupling film comprising a first magnetic layer (*element 7*), a second magnetic layer (*element 9*) further away from said substrate surface than said first magnetic layer, and a spacer layer (*element 8*) interposed between said first and second magnetic layers and having a principal surface nearer to said second magnetic layer than said first magnetic layer, said spacer layer having a thickness of 1.2 nm or less (*col. 6, lines 55 – 60*), said exchange coupling film causing antiferromagnetic coupling such that said first magnetic layer has a magnetization direction antiparallel to that of said second magnetic layer (*col. 3, lines 1 – 47 and col. 4, lines 10 – 51*).

Abarra et al. fail to disclose controlling the surface roughness of the principal surface of the spacer layer such that it is not greater than the thickness of the spacer layer.

However, Fukuzawa et al. teach that in a laminated ferromagnetic structure/synthetic antiferromagnetic structure, it is important to control the surface roughness of the spacer layer to be less than the thickness of the layer inorder to maintain the thermal stability of the coupling function of the layer (*Paragraphs 0005 and 0309 – 0314*). While the Examiner acknowledges that Fukuzawa et al. is directed to a magnetic head and Abarra et al. is directed to a magnetic recording medium, the Examiner notes that one of ordinary skill in either art would readily appreciate that laminated ferromagnetic structures meeting applicants' claimed structural limitations are used in both related fields (*see Abarra et al., col. 4, lines 14 – 24, which explicitly teach that it is known in the recording medium art that these type of structures are used in spin-valve magnetic heads*). Furthermore, the Examiner notes that one of ordinary skill in the art would have been motivated to combine the teachings of Fukuzawa et al. with that of Abarra et al. since Abarra et al. desires improved thermal stability (*col. 3, lines 1 – 13*), which is exactly the benefit that Fukuzawa et al. proscribes to the controlled surface roughness (*Fukuzawa et al., Paragraph 0309 – 0314*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant(s) invention to modify the device of Abarra et al. to insure that the surface roughness of the spacer layer met applicants' claimed limitations as taught by Fukuzawa et al. inorder to maintain the thermal stability of the coupling function of the layer.

Regarding claim 2, Abarra et al. disclose controlling the thickness of the spacer layer to 0.4 – 0.8 nm, hence the combined teachings results in a teaching to control the

surface roughness to <0.4 - <0.8 nm, thereby reading on applicants' claimed surface roughness range.

Regarding the limitations in claims 5 and 16, it has been held that where claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established and the burden of proof is shifted to applicant to show that prior art products do not necessarily or inherently possess characteristics of claimed products where the rejection is based on inherency under 35 USC 102 or on *prima facie* obviousness under 35 USC 103, jointly or alternatively. Therefore, the *prime facie* case can be rebutted by ***evidence*** showing that the prior art products do not necessarily possess the characteristics of the claimed product. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

In the instant case, Abarra et al. disclose substantially identical materials for the magnetic layers and spacer layers as used by applicant. Therefore, in addition to the above disclosed limitations, the presently claimed property would have necessarily been present because the disclosed and prior art inventions are formed from substantially identical materials.

Regarding claims 6 and 17, Abarra et al. disclose structures meeting applicants' claimed structural limitations (*Figure 1*).

Regarding claims 11 and 18, Abarra et al. disclose spacer layers meeting applicants' claimed limitations (*col. 5, lines 18 – 33*).

Regarding claims 12 and 19, Abarra et al. disclose a structure meeting applicants' claimed limitations (*Figure 2, where the Examiner notes that the first magnetic layer is taken as element 7-1, the first spacer layer is element 8-1, the second magnetic layer is element 7 and the third magnetic layer is element 9*). The limitation(s) "is used as a layer for controlling exchange coupling and crystal orientation of said third magnetic layer" is (an) intended use limitation(s) and is not further limiting in so far as the structure of the product is concerned. Note that "in apparatus, article, and composition claims, intended use must result in a ***structural difference*** between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. ***If the prior art structure is capable of performing the intended use, then it meets the claim.*** In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art." [emphasis added] *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); *In re Otto*, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963). See MPEP § 2111.02. However, the Examiner notes that Abarra et al. explicitly teach that the layer is exchange coupled to the third magnetic layer via element 8.

Regarding claims 13 and 20, Abarra et al. disclose an additional layer meeting applicants' claimed limitations (*element 8*). The limitation "for promoting the crystal orientation of said third magnetic layer" is an intended use limitation and there does not appear to be any structural difference between the claimed invention and the prior art.

9. Claims 14, 15, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarra et al. (either reference) in view of Fukuzawa et al. as applied above, and further in view of Chen et al. (U.S. Patent No. 5,846,648).

Abarra et al. and Fukuzawa et al. are relied upon as described above.

Neither of the above disclose a grain size of the recording layer, though the Examiner notes that the Abarra et al. layer 9 functions as the claimed intended use "used as a magnetic recording layer" (*col. 3, lines 1 – 48 and col. 5, line 33 bridging col. 7, line 8*).

However, Chen et al. teach that the average grain size in a magnetic recording layer should be controlled to not greater than 10 nm inorder to insure superior magnetic properties (*col. 7, line 36 bridging col. 8, line 28*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Abarra et al. (either reference) in view of Fukuzawa et al. to utilize a grain size in layer 9 (the layer "used as a magnetic recording layer") as taught by Chen et al. since such a grain size in a magnetic recording layer insures superior magnetic properties.

Response to Arguments

10. The rejection of claims 1 – 6 and 8 - 22 under Double Patenting and 35 U.S.C § 102(e) and/or 102(f) – Tomiyasu et al.

Applicant(s) argue(s) that Tomiyasu et al. fail to render obvious the limitation that the principal surface of the spacer layer has a surface roughness Ra which is not greater than the thickness of the spacer layer (*page 10 of response*). The Examiner respectfully disagrees.

The Examiner notes that Tomiyasu et al. teaches that the thickness of the spacer layer is ~0.7 nm while the Ra is less than 0.6 nm, hence reading on the claimed limitations.

11. The prior rejection of claims 1 - 8 under 35 U.S.C § 102(e) and/or 103(a) – Kikitsu et al.

Applicant(s) arguments have been considered but are moot in view of the new ground(s) of rejection.

12. The rejection of claims 1 – 6 and 8 - 22 under 35 U.S.C § 103(a) – Abarra et al. in view of various references

Applicant(s) arguments have been considered but are moot in view of the new ground(s) of rejection. In so far as they apply to the present rejection of record, applicant(s) argue that combining Fukuzawa et al., directed to a magnetic device, with a

magnetic recording medium reference is improper (*page 12 of response*). The Examiner respectfully disagrees.

As noted by the magnetic recording medium reference (Abarra et al.), one of ordinary skill in the art would clearly recognize the use of the exchange layer structures in the magnetic head art.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Applicants' amendment resulted in embodiments not previously considered (i.e. "such that the first magnetic layer has a magnetization direction antiparallel to that of the second magnetic layer") which necessitated the new grounds of rejection, and hence

the finality of this action. The Examiner notes that original claim 7 merely recited that the exchange coupling film causes antiferromagnetic coupling, but did not explicitly require that the magnetization directions of the first and second magnetic layer be antiparallel. While the Examiner notes that one of ordinary skill in the art would readily appreciate that antiferromagnetic coupling, ***by definition***, results in antiparallel magnetization directions for the two magnetic layers so coupled, prior claim 7 was of a different scope than present claims 1 or 2. Specifically, prior claim 7 covered embodiments including additional magnetic layers antiferromagnetically coupled to one or both of the first and/or second magnetic layers, without necessarily having the first and second magnetic layers being antiferromagnetically coupled to each other (i.e. having their magnetization directions antiparallel). An example would be Abarra et al., Figure 2, with the exchange layer structure being layers 7-1 through 9, with layer 7-1 being the first magnetic layer, layer 8-1 being the spacer layer and layer 9 being the second magnetic layer. The exchange layer structure "causes antiferromagnetic coupling", but the magnetization directions of layers 7-1 and 9 would be parallel, not anti-parallel (they would both be anti-parallel to the magnetization direction of layer 7, however).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
May 9, 2006

Kevin M. Bernatz, PhD
Primary Examiner